



## New and unusual causes of foot drop

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### Abstract

Several reasons for foot drop have been reported in literature. In recent years, innovations have been added associated with some current treatment methods. The study comprised 12 patients who presented with foot drop, with rarely seen or not previously encountered causes. The patients comprised 6 males and 6 females with a mean age of 41.25 years (range, 18-72 years). The etiology of the foot drop which developed in the patients was after taking the peroneus longus tendon as autograft with a tendon stripper in 2 cases, after revision total knee arthroplasty in 1 case, after primary total knee arthroplasty in 2 cases, after a fall while playing football in 1, after injection in 3, secondary to bilateral compartment syndrome in 1, after lying in a lateral position for a long time during a kidney operation in 1 and following a burn injury in 1 case. Of the total 12 patients, transfer of the tibialis posterior tendon to the anterior was applied in 4 cases. Decompression and fasciotomy was applied to 2 cases. In 3 cases, surgical tendon transfer was recommended but the patients rejected this treatment. Conservative follow-up was applied to 3 cases. The 4 patients applied with tendon transfer returned to daily activities problem-free. In the 2 cases applied with decompression and fasciotomy, full sensory and motor functions returned to normal in the 15th and 16th week. The motor and sensory functions of the 3 patients followed up conservatively returned to normal in the 14th-15th weeks. Foot drop is the result of an underlying problem rather than a disease per se. New treatment methods applied in orthopaedic surgery may cause the development of unusual foot drop. An awareness of these is necessary together with a detailed anamnesis, examination and laboratory tests to be able to determine the reason and plan treatment.

**Keywords:** Foot drop, tendon transfer, sciatic, peroneal nerve

### Introduction

Foot drop is defined as a weakness or failure of function in the tibialis anterior, causing restricted functional movement, a slowing down of walking speed and an increased risk of falling [1,2]. Several reasons for foot drop have been reported in literature. These include diseases affecting the central nervous system, trauma, diseases affecting the peripheral nervous system and diseases or trauma affecting the muscle and tendon. Many reasons have been reported such as ganglion cyst in the proximal tibiofibular joint [3], motor cortex contusion [4], long-term lead intoxication [5], tight application of compression bandage [6,7], after lateral decubitus position [8] following dislocation reduction after total hip arthroplasty and gluteal haematoma [9,10], a complication of disc surgery [11], peripheral nerve entrapment [12,13], poorly administered injections [14], sciatic nerve pressure, piriformis syndrome [15], knee dislocations [16], following spinal and spinoepidural anaesthesia [17], paraspinal abscess [18], myopathies [19], neuropathic demyelination, hereditary neuropathies [20], popliteal artery aneurism [21], stroke [22,23], neuromuscular diseases [24,25], degenerative lumbar spinal diseases [26],

gluteal compartment syndrome [27], decompression in burns [28], parasitic diseases such as neuro schistosomiasis [29], after lower extremity compartment syndrome [30], and after total knee prosthesis [31].

The resolution of this problem, which severely affects the daily activities of the patient, is extremely important for the later life of the individuals [3]. The aim of this study was to report current orthopaedic surgical treatment methods which could be the cause of uncommon foot drop.

### Material and Methods

The study comprised 12 patients who presented with foot drop, with rarely seen or not previously encountered causes. The patients comprised 6 males and 6 females with a mean age of 41.25 years (range, 18-72 years).

The peroneus longus tendon can be used as autograft for the anterior cruciate ligament. After harvesting with a tendon stripper, foot drop developed in 2 cases following excessive tightness in the donor site and these 2 patients were admitted for emergency surgery in the early period. The haematoma was drained, haemostasis was provided and fasciotomy was applied, then the patients were applied with a short-leg splint and followed up with reflex ankle-foot orthosis (AFO). In the 15th and 16th weeks, all sensory and motor functions had returned to normal.

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In 1 patient, foot drop developed after revision total knee arthroplasty. The patient presented at our clinic 6 months postoperatively and the fibular nerve was explored. The nerve was seen to be damaged at the level of the fibula neck and a large part of the anatomic integrity was seen to be formed of fibrotic tissue. The nerve was repaired with microsurgery. During a 12-month follow-up period, as no motor activity was observed, the tibialis posterior tendon was transferred to the anterior.

In 2 patients with foot drop that developed after primary total knee arthroplasty, follow-up was applied conservatively with reflex AFO.

In 1 patient, who was injured in a fall while playing football and foot drop developed, nerve exploration had been performed at another centre, there was said to be a severe traction injury and collateral ligament repair had been applied. The patient presented at our polyclinic after 2 years during which time no improvement had been seen. Tendon transfer was recommended but as the patient refused surgical treatment, he continued with a foot drop orthosis.

In 3 patients, foot drop developed following a diclofenac sodium injection and was followed up with a foot drop orthosis, and as no improvement was seen after 1 year of

follow-up, tendon transfer was recommended. The treatment was accepted by 1 patient and the other 2 continued with a foot drop orthosis.

Bilateral foot drop developed in 1 patient who received long-term dialysis due to liver and kidney failure during a 42-day stay in the intensive care unit (ICU) following blood transfusion of 110 units as a result of a penetrating stab wound to the abdomen. As repeated intracompartmental pressure measurements of  $>30\text{mmHg}$  were taken during the stay in ICU, fasciotomy was recommended, but the ICU specialists did not permit the operation. Following discharge from ICU, the patient received a physical therapy program, but as no improvement was recorded, bilateral tibialis posterior tendon transfer to the anterior was applied after 1.5 years (Figures 1, 2).

In 1 diabetic patient, foot drop developed following a urology operation which lasted for 8-9 hours in the lateral decubitus position. This patient was followed up with a reflex AFO.

In 1 patient, foot drop developed following a burn around the knee in childhood. Tendon transfer was applied 20 years after the burn injury. (Table 1)



**Figure 1:** lateral view of the left foot applied with tendon transfer because of bilateral foot drop a) in normal position b) in plantar flexion c) in dorsiflexion



**Figure 2:** lateral view of the right foot applied with tendon transfer because of bilateral foot drop a) in normal position b) in plantar flexion c) in dorsiflexion

**Table 1:** Distribution of patients

PATIENT	AGE	GENDER	ETIOLOGY	TREATMENT	FINAL STATUS
1	24	M	Peroneus longus tendon harvested with tendon stripper as graft	Hemostasis, drainage of hematoma, fasciotomy	Full recovery
2	22	M	Peroneus longus tendon harvested with tendon stripper as graft	Hemostasis, drainage of hematoma, fasciotomy	Full recovery
3	68	F	Peroneal nerve injury at the level of the fibula neck	Neurorrhaphy, Transfer of tibialis posterior tendon to anterior	Problem-free return to daily activities
4	72	F	Following primary knee prosthesis	Conservative follow-up	Full recovery
5	68	F	Following primary knee prosthesis	Conservative follow-up	Full recovery
6	55	M	Injury from a fall while playing football	Surgical treatment not accepted	Continuing daily life with a foot drop orthosis
7	18	M	Following diclofenac sodium injection	Transfer of tibialis posterior tendon to anterior	Problem-free return to daily activities
8	26	F	Following diclofenac sodium injection	Surgical treatment not accepted	Continuing daily life with a foot drop orthosis
9	30	F	Following diclofenac sodium injection	Surgical treatment not accepted	Continuing daily life with a foot drop orthosis
10	26	M	Bilateral compartment syndrome	Bilateral transfer of tibialis posterior tendon to anterior	Problem-free return to daily activities
11	56	M	Following lateral decubitus position	Conservative follow-up	Full recovery
12	30	F	Burn injury sequela	Transfer of tibialis posterior tendon to anterior	Problem-free return to daily activities

## Results

In 2 patients who developed foot drop following peroneus longus tendon graft, motor activity started to be observed in the 8th week. Full recovery of dorsiflexion of the ankle and all the toes was seen in 1 patient at 15 weeks and in 1 at 16 weeks.

In 4 patients where the tibialis posterior tendon was surgically transferred to the anterior (subcutaneously or by opening a window from the interosseous membrane), all returned to daily activities problem-free. Tendon transfer was recommended but rejected by 3 patients and they continued with a foot drop orthosis.

Motor activity was started in 1 patient in the 7th week and in 1 in the 8th week where foot drop developed following primary total knee arthroplasty. Full recovery of strong dorsiflexion of the ankle and toes was seen in 1 patient in the 14th week and in the other in the 15th week.

In the case where foot drop developed after a lengthy period in the lateral decubitus position, motor activity was observed after the 8th week. Full motor functions were observed to have returned in the 14th week.

## Discussion

In the current study, foot drop developed in 2 cases after harvesting the peroneus longus tendon as a tendon graft with a tendon stripper. From a scan of literature, no other report of such an etiology of foot drop was found. Foot drop has been reported to occur after total knee prosthesis due to tight bandage application, fibula head avulsion, apparatus making inappropriate excessive pressure, vascular injuries and compartment syndrome

[17,21,31,32,33]. In 2 of the current study cases, pneumatic tourniquet was used for an appropriate time at an appropriate pressure and no tight bandaging was used postoperatively. No fibula head avulsion, vascular injuries or compartment syndrome were seen in the current cases. Both of these patients were applied with spinal anaesthesia and neither had any systemic disease such as diabetes. In the investigations made, the etiology could not be determined. Cauda equina lesions have been researched in literature but no findings of this were obtained.

In 1 case of the current series, foot drop developed after revision total knee arthroplasty. The fibular nerve was explored and was seen to be damaged at the level of the fibula neck and it was determined that a large part of the anatomic integrity was provided by fibrotic tissue. Microsurgery and tendon transfer were performed and such a case could not be found in literature.

The patient with foot drop that developed after a fall while playing football refused a tendon transfer operation and continued with a foot drop orthosis. Similar cases reported in literature have been of patients with joint laxity in particular [34].

In 3 patients, foot drop developed after a diclofenac injection and similar cases have been reported in literature as poor injections. As the main reason, inappropriate injection site and technique have been held responsible [1435].

Foot drop developed secondary to bilateral compartment syndrome in 1 patient who was in ICU for 42 days due to liver and kidney failure and received blood transfusion of 110 units as a result of a penetrating stab wound to the abdomen. Under ICU conditions, no intervention was

permitted and later bilateral tendon transfer was performed. No similar case could be found in literature.

The patient who had developed foot drop after remaining in the lateral decubitus position for a long time was followed up conservatively. There are very few reports of such cases in literature [8].

Cases of foot drop developing secondary to burn injuries have been reported in literature and have been said to be nerve lesions following decompression in the burn [28]. In the case in the current study, tendon transfer was performed 20 years after the burn injury.

### Conclusion

Treatment of foot drop, which is defined as weakness in dorsiflexion of the foot and toes, is planned according to the cause. Foot drop is a symptom of an underlying problem rather than a disease itself. The cause should be established through a combination of detailed anamnesis, physical examination and laboratory tests. When evaluating patients, uncommon causes and new orthopaedic surgical methods should not be overlooked.

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